Claims

1.   A method for estimating the position of a movable
device in a borehole, the method comprising the steps of:
     (a) providing a prior location probability distribution
5   associated with a first position of the device in the
borehole,
     (b) providing a measurement of a putative distance
moved by the device and/or a measurement of a characteristic
of the surroundings of the device, the or each measurement
10   being associated with movement of the device to a subsequent
position in the borehole, and
     (c) calculating a posterior location probability
distribution associated with the subsequent position, the
posterior location probability distribution being
15   conditional on the prior location probability distribution,
and the or each measurement.

2.   A method according to claim 1, wherein steps (a) to (c)
are repeated for further positions of the device, the
posterior location probability distribution of one repeat
20   becoming the prior location probability distribution of the
following repeat.

3.   A method according to claim 1, wherein the borehole is
a hydrocarbon well borehole.

4.   A method according to claim 1, wherein the device is a
25   borehole logging tool.

5.   A method according to claim 1, wherein the device is a
drill string bottom hole assembly.

6.   A method according to claim 1, wherein at step (b) a measurement of the putative distance moved by the device is provided.

7.   A method according to claim 6, wherein the device comprises an odometer which measures the putative distance.

8.   A method according to claim 1, wherein at step (b) a measurement indicating whether the device is adjacent to a borehole casing collar is provided.

9.   A method according to claim 1, wherein at step (b) a measurement of the amount of gamma-rays emanating from the surrounding rock formation is provided.

10.   A method according to claim 1, wherein the representation of probability distribution resulting from at least one measurement is not zero-mean Gaussian.

11.   A method according to claim 10, wherein a Kalman filter is used to process measurements with zero-mean Gaussian distribution and a grid distribution or particle filter is used to process measurements with non zero-mean Gaussian distribution.

12.   A computer system operatively configured to perform the method of claim 1.